

**EPA Superfund
Record of Decision:**

**MARTIN-MARIETTA, SODYECO, INC.
EPA ID: NCD001810365
OU 01
CHARLOTTE, NC
09/24/1987**

AREA A - THIS LANDFILL'S USE BEGAN IN THE LATE 1930'S. WASTE MATERIALS DISPOSED OF AT THIS FACILITY INCLUDED SULFUR DYE CLARIFICATION RESIDUES, OFF-SPECIFICATION SULFUR AND DISPERSE DYES, FILTER CLOTHS, EMPTY METAL AND CARDBOARD DRUMS AND CARTONS, SMALL AMOUNTS OF NON-ACIDIC, NON-FLAMMABLE DISCARDED CHEMICALS AND CHEMICAL WASTES, AND CONSTRUCTION DEBRIS. THE LANDFILL WAS CLOSED SOMETIME BETWEEN 1973 AND 1974. MOST OF THE AREA ABOVE THE FACILITY IS NOW COVERED WITH ASPHALT AND BUILDINGS.

AREA B - THIS LANDFILL OPERATED BETWEEN 1973 AND 1978 AND RECEIVED WASTES THAT HAD PREVIOUSLY BEEN DISPOSED IN AREA A. THE AREA IS PRESENTLY COVERED WITH GRAVEL AND USED AS A TRUCK STAGING AREA.

AREA C - THIS AREA ORIGINALLY CONSISTED OF THREE COVERED TRENCHES THAT CONTAINED THE REMAINS OF LABORATORY AND PRODUCTION SAMPLES, DISTILLATION TARS, AND WASTE SOLVENTS. THE TWO NORTHERN PITS WERE EXCAVATED IN MARCH 1981 AND THE CONTENTS WERE TRUCKED OFF-SITE TO A LANDFILL IN PINEWOOD, SOUTH CAROLINA. REMOVAL OF THE REMAINING PIT WAS CONDUCTED IN 1983. AFTER EXCAVATION ACTIVITIES, AREA C WAS REGRADED AND GRASSED.

AREA D - THIS AREA FORMERLY CONTAINED TWO WASTEWATER SETTLING PONDS. THE PONDS WERE TAKEN FROM SERVICE IN 1966; ONE WAS CLEANED OUT IN 1973 AND THE OTHER BETWEEN 1976 AND 1977. THIS AREA CURRENTLY HOLDS A LINED FRESH WATER POND AND A FUEL OIL STORAGE TANK. A FRENCH DRAIN IS LOCATED IMMEDIATELY DOWNGRAIENT OF THE AREA TO INTERCEPT SHALLOW GROUNDWATER.

AREA E - NO WASTES ARE KNOWN TO HAVE BEEN DISPOSED OF IN THIS AREA WHICH LOCATED DOWNGRAIENT OF THE OLD PLANT MANUFACTURING AREA.

THE FIRST INDICATION OF POTENTIAL GROUNDWATER CONTAMINATION AT THE SODYECO SITE WAS THE DISCOVERY OF ORGANIC SOLVENTS IN THE COMPANY'S POTABLE WATER WELL IN SEPTEMBER 1980. CONTAMINATED GROUNDWATER WAS ALSO DETECTED IN WATER SUPPLY WELLS ADJACENT TO THE PLANT. RESIDENTS OF FIVE HOMES WERE VACATED AND THE PLANT WATER SUPPLY WAS CHANGED FROM GROUNDWATER TO SURFACE WATER (CATAWBA RIVER).

IN JUNE 1982, A HAZARDOUS WASTE SITE INVESTIGATION OF THE SODYECO SITE WAS CONDUCTED BY EPA. RESULTS OF SURFACE WATER, GROUNDWATER AND SEDIMENT SAMPLES REVEALED THE PRESENCE OF ORGANIC CONTAMINANTS IN THE GROUNDWATER AND SMALL AMOUNTS IN THE SURFACE WATER.

IN FEBRUARY 1983, EPA SAMPLED ELEVEN POTABLE WATER WELLS FOR PH, SULFATE AND METALS. ALL WELLS WERE OFF-SITE TO THE EAST AND NORTH OF THE PLANT BOUNDARY. ALL SAMPLES MET PRIMARY AND SECONDARY DRINKING WATER STANDARDS FOR THE CRITERIA EVALUATED.

THE SODYECO SITE WAS PLACED ON THE NATIONAL PRIORITIES LIST IN DECEMBER 1982, DUE TO THE PRESENCE OF POTABLE WATER WELLS WITHIN A THREE MILE RADIUS AND THE PRESENCE OF TWO MUNICIPAL SURFACE WATER INTAKES ON THE CATAWBA RIVER. EPA AND SANDOZ SIGNED A RI/FS CONSENT AGREEMENT ON FEBRUARY 10, 1986. THE FINAL RI REPORT WAS ISSUED AUGUST 17, 1987 AND THE DRAFT FS WAS RELEASED TO THE PUBLIC AUGUST 19, 1987.

THE OBJECTIVES OF THE SITE INVESTIGATION WERE TO DETERMINE:

- THE POPULATION, ENVIRONMENTAL AND WELFARE CONCERNS AT RISK;
- THE ROUTES OF EXPOSURE;
- THE AMOUNT, CONCENTRATION, HAZARDOUS PROPERTIES, LOCATIONS, ENVIRONMENTAL FATE AND TRANSPORT, AND THE FORM OF THE SUBSTANCES PRESENT;
- HYDROGEOLOGICAL FACTORS;
- THE EXTENT TO WHICH THE SUBSTANCES HAVE MIGRATED OR ARE EXPECTED TO MIGRATE FROM THE AREA OF THEIR ORIGINAL LOCATION AND WHETHER FUTURE MIGRATION MAY POSE A THREAT TO PUBLIC HEALTH, WELFARE OR THE ENVIRONMENT;
- THE CONTRIBUTION OF THE CONTAMINATION TO AN AIR, LAND, WATER, AND/OR FOOD CHAIN CONTAMINATION PROBLEM.

THE PURPOSE OF THE FEASIBILITY STUDY WAS TO DEVELOP AND EXAMINE REMEDIAL ALTERNATIVES FOR THE SITE, AND TO SCREEN THESE ALTERNATIVES ON THE BASIS OF PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, COST-EFFECTIVENESS AND TECHNICAL IMPLEMENTABILITY. IN ACCORDANCE WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA), AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA), ALTERNATIVES IN

WHICH TREATMENT WOULD PERMANENTLY AND SIGNIFICANTLY REDUCE THE VOLUME, TOXICITY, OR MOBILITY OF THE HAZARDOUS SUBSTANCES AT THE SITE WERE PREFERRED OVER THOSE ALTERNATIVES NOT INVOLVING SUCH TREATMENT.

#ENF

2.0 ENFORCEMENT ANALYSIS

THE SODYECO SITE WAS ADDED TO THE NPL IN DECEMBER 1982 AND EPA ASSUMED LEAD RESPONSIBILITY FOR THE SITE AT THAT TIME. THE SODYECO COMPANY HAS OPERATED ON THE SITE SINCE 1936. THE CURRENT OWNER, SANDOZ, ACQUIRED THE SITE IN 1983 AND AGREED TO PERFORM THE RI/FS. THEREFORE, NO POTENTIALLY RESPONSIBLE PARTY SEARCH WAS CONDUCTED. A NOTICE LETTER WAS SENT TO SANDOZ CHEMICALS ON AUGUST 30, 1985. NEGOTIATIONS FOR THE RI/FS CONSENT AGREEMENT WERE CONCLUDED WITH THE SIGNING OF THE DOCUMENT BY BOTH EPA AND SANDOZ ON FEBRUARY 10, 1986.

THE REMEDIAL DESIGN AND REMEDIAL ACTION WILL BE CONDUCTED UNDER AN AMENDMENT TO THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) PART B PERMIT NUMBER NCD001810365, ISSUED MARCH 31, 1987. PERSONNEL IN EPA'S RCRA PROGRAM WILL OVERSEE THE WORK TO BE PERFORMED.

#CSS

3.0 CURRENT SITE STATUS

3.1 HYDROGEOLOGIC SETTING

THE SODYECO SITE IS LOCATED IN THE PIEDMONT PHYSIOGRAPHIC PROVINCE, A NORTHEAST TRENDING ZONE UNDERLAIN BY IGNEOUS AND METAMORPHIC ROCKS. THE PIEDMONT IS SUBDIVIDED INTO OTHER NORTHEAST TRENDING GEOLOGIC BELTS. ONE OF THESE, WHICH CONTAINS THE SODYECO SITE, IS TERMED THE CHARLOTTE BELT. THIS BELT IS CHARACTERIZED BY RESIDUAL SOILS DEVELOPED FROM THE IN-PLACE CHEMICAL WEATHERING OF ROCK WHICH WAS SIMILAR TO THE BEDROCK CURRENTLY UNDERLYING THE SITE.

GROUNDWATER RECHARGE IN THIS AREA IS DERIVED ALMOST ENTIRELY FROM LOCAL PRECIPITATION. GENERALLY, THE DEPTH TO THE WATER TABLE DEPENDS ON THE TOPOGRAPHY AND ROCK WEATHERING. THE WATER TABLE VARIES FROM THE GROUND SURFACE IN VALLEYS (STREAMS) TO MORE THAN 100 FEET BELOW THE GROUND SURFACE IN SHARPLY RISING HILLS.

A GROUNDWATER DIVIDE IS LOCATED APPROXIMATELY 50 FEET NORTH OF CERCLA AREA A AND APPROXIMATELY 900 FEET NORTH OF AREA C. IN GENERAL, GROUNDWATER FLOW IS NORTHERLY, NORTH OF THE DIVIDE, AND SOUTH-SOUTHWESTERLY, SOUTH OF THE DIVIDE.

AVERAGE GROUNDWATER FLOW RATES FROM THE CERCLA AREAS TO LONG CREEK WERE CALCULATED TO BE APPROXIMATELY 180 GALLONS PER DAY (GPD) FROM AREA A, APPROXIMATELY 200 GPD FROM AREA B AND APPROXIMATELY 70-140 GPD FOR AREA C. ESTIMATED FLOW FROM CERCLA AREAS D AND E TO THE CATAWBA RIVER WERE APPROXIMATELY 3,000 GPD AND 10,000 GPD RESPECTIVELY.

THE PRIMARY HYDROLOGIC FEATURES INFLUENCING THE SODYECO SITE ARE THE CATAWBA RIVER (REGIONAL DRAINAGE FEATURE) AND LONG CREEK (MAJOR TRIBUTARY TO THE RIVER). SURFACE DRAINAGE FROM THE WESTERN SIDE OF THE SITE IS DIRECTLY TO THE RIVER, FROM THE NORTHEASTERN AREA TO THE RIVER VIA SEVERAL SMALL STREAMS, AND FROM THE EASTERN AND SOUTHEASTERN AREAS TO LONG CREEK AND THEN TO THE RIVER. THE FIVE CERCLA AREAS ARE NOT WITHIN THE 100-YEAR FLOOD ELEVATION OF LONG CREEK AND THE MAXIMUM RECORDED LEVEL IN THE CATAWBA RIVER SINCE DEVELOPMENT OF DOWNSTREAM LAKE WYLIE IN 1904.

3.2 SITE CONTAMINATION

THE SODYECO SITE CONTAINS FIVE CERCLA AREAS DESIGNATED AS A, B, C, D AND E. SOIL, GROUNDWATER, SURFACE-WATER AND SEDIMENT SAMPLES HAVE BEEN COLLECTED IN AND AROUND EACH AREA AND ANALYZED. ALL SAMPLES HAVE BEEN ANALYZED FOR THE FOLLOWING VOLATILE ORGANIC INDICATOR PARAMETERS THAT WERE CHOSEN BASED UPON PREVIOUS HSL SCANS AT THE SODYECO SITE:

- TRICHLOROETHYLENE
- TETRACHLOROETHYLENE
- CHLOROBENZENE
- ETHYLBENZENE
- O-DICHLOROBENZENE
- TOLUENE

- XYLENES.

SURFACE-WATER AND SEDIMENT SAMPLES WERE ALSO ANALYZED FOR THREE POLYNUCLEAR AROMATIC HYDROCARBONS:

- ANTHRACENE
- FLUORENE
- PHENANTHRENE.

IN ADDITION TO THE ABOVE ANALYSES, TWO SURFACE WATER SAMPLES FROM THE CATAWBA RIVER AND TWO SURFACE WATER SAMPLES FROM LONG CREEK (UPSTREAM AND DOWNSTREAM IN EACH) WERE ANALYZED FOR THE HAZARDOUS SUBSTANCE LIST (HSL) PARAMETERS. SINCE ACETONE WAS DETECTED IN MANY SAMPLES, ACETONE RESULTS ARE ALSO REPORTED. ACETONE IS BELIEVED TO HAVE BEEN A LABORATORY AND DECONTAMINATION PROCESS CONTAMINANT.

AREAS A & B

FIGURE 4 SHOWS THE SOIL AND GROUNDWATER SAMPLING LOCATIONS IN AND AROUND AREAS A & B INCLUDES THE ANALYTE CONCENTRATIONS DETECTED.

BORING B-2-1 LIES BETWEEN CERCLA AREAS A AND B AND SHOWS CHLOROBENZENE CONCENTRATIONS OF 220 AND 43 UG/KG AND O-DICHLOROBENZENE CONCENTRATIONS OF 85 AND 26 UG/KG AT DEPTHS OF 23.5 TO 25 FEET AND 28.5 TO 30 FEET, RESPECTIVELY. SINCE THIS BORING LIES DOWNGRADIENT OF AREA A AND AT A DEPTH WITHIN THE WATER TABLE, THE CONTAMINATION MOST LIKELY INDICATES ORGANIC MIGRATION IN THE DIRECTION OF THE GROUNDWATER GRADIENT FROM AREA A TOWARDS AREA B.

FIGURE 5 SHOWS THE LOCATIONS OF GROUNDWATER SAMPLING WELLS WHERE NO ORGANIC CONTAMINATION WAS DETECTED.

VOLATILE ORGANICS WERE DETECTED IN SAMPLES FROM WELL CLUSTER WQ-5A, WHICH IS LOCATED ABOUT 100 FEET FROM THE SOUTHWESTERN EDGE OF AREA B.

THESE RESULTS INDICATE THAT THE UPPER AQUIFER ZONE IS NOT CONTAMINATED. THE INTERMEDIATE AQUIFER ZONE IN THE VICINITY OF CERCLA AREA B SHOWS CONTAMINATION WITH TETRACHLOROETHYLENE, CHLOROBENZENE, AND O-DICHLOROBENZENE, AND THE DEEP AQUIFER ZONE SHOWS MUCH LOWER CONCENTRATIONS OF TWO OF THESE THREE INDICATOR PARAMETERS (CHLOROBENZENE AND ORTHO-DICHLOROBENZENE).

AREA C

FIGURE 6 DEPICTS THE SOILS AND GROUNDWATER SAMPLING LOCATIONS IN AREA C AND LISTS ALL ANALYTES DETECTED WITH THEIR RESPECTIVE CONCENTRATIONS.

THE RESULTS FROM THE SAMPLES DEFINE THE MAXIMUM BOUNDARY OF THE CONTAMINATED SOIL IN AREA C. IN THE PAST, THIS AREA CONTAINED THREE TRENCHES OR PITS, C-1, C-2, AND C-3.

BASED ON THE BORING ANALYSES AND FIELD OBSERVATIONS, THERE ARE APPROXIMATELY 5,800 CUBIC YARDS OF CONTAMINATED SOIL AND UNCONTAMINATED SOIL COVER IN AREA C.

FOUR WELLS IN THE IMMEDIATE VICINITY OF AREA C WERE SAMPLED: WQ-27, WQ-28, WQ-29 (WELL CLUSTER), AND WQ-34 (WELL CLUSTER). WELL WQ-6 IS CONSIDERED THE SHALLOW WELL OF WELL CLUSTER WQ-29.

AREA D

ANALYTE CONCENTRATIONS DETECTED IN THE SOIL AND GROUNDWATER SAMPLES FROM AREA D ARE SHOWN IN FIGURE 7. BORING D-1-3 WAS SAMPLED TWICE. THE VOLUME OF CONTAMINATED SOIL IS ABOUT 40 CUBIC YARDS WITH ABOUT 75 CUBIC YARDS OF COVER SOIL.

ALL AQUIFER ZONES OF WELL CLUSTER WQ-33, WHICH ARE LOCATED APPROXIMATELY 75 FEET SOUTH OF D-2-2, ARE CONTAMINATED WITH VOLATILE ORGANICS. THESE RESULTS INDICATE THAT CONTAMINANTS IN AREA D HAVE MIGRATED DOWNWARD INTO THE ALLUVIUM, GRAVEL AND UPPER BEDROCK ZONE TO AN 84 FOOT DEPTH.

GROUNDWATER FLOWING THROUGH AREA D DISCHARGES INTO THE CATAWBA RIVER.

AREA E

ALL BORINGS SAMPLED IN AREA E WERE FIELD SCREENED AS CLEAN (SEE FIGURE 8). THESE RESULTS INDICATE THAT THE UNSATURATED ZONE AND THE SHALLOW, SATURATED ZONE SAMPLED WERE UNCONTAMINATED. SAMPLES FROM WELL K AND WELL CLUSTER WQ-32 CONTAINED VOLATILE ORGANICS (INTERMEDIATE AND DEEP ZONES).

GROUNDWATER FLOW TO THIS AREA IS FROM THE OLD MANUFACTURING AREA LOCATED SOUTHEAST OF AREA E WHERE CHLOROBENZENE AND O-DICHLOROBENZENE WERE FORMERLY STORED.

BOUNDARY

FOURTEEN WELLS ALONG THE SITE PROPERTY BOUNDARIES WERE SAMPLED. THESE WELLS WERE POSITIONED TO BE IN THE MOST SENSITIVE AREAS OF CONCERN, NAMELY PREFERENTIAL FLOW DIRECTIONS (I.E., CHANNELIZED DRAINAGE FEATURES) AND/OR IN LINE WITH POTENTIAL GROUNDWATER USERS (ALTHOUGH UPGRAIDENT). FIGURE 5 SHOWS THE WELL LOCATIONS. SINCE NO VOLATILE ORGANICS WERE DETECTED IN ANY OF THESE BOUNDARY WELLS, NO CONTAMINATED GROUNDWATER MIGRATION BEYOND THE NORTH, SOUTH, AND EAST BOUNDARIES HAS BEEN OBSERVED OR IS EXPECTED GIVEN THE SITE HYDROGEOLOGY.

SURFACE WATER

THE CATAWBA RIVER IS THE MAJOR SURFACE WATER FEATURE AT THE SITE. TRIBUTARY B AND LONG CREEK EMPTY INTO THE CATAWBA RIVER AND TRIBUTARIES A AND C FLOW INTO LONG CREEK. THE ANALYTICAL RESULTS OF THE SURFACE WATER SAMPLES AND SAMPLE LOCATIONS ARE SHOWN IN FIGURE 9. TWO SAMPLES FROM LONG CREEK AND TWO SAMPLES FROM THE CATAWBA RIVER WERE ANALYZED FOR THE HAZARDOUS SUBSTANCE LIST PARAMETERS. NO VOLATILE INDICATOR PARAMETERS WERE DETECTED.

GROUNDWATER FROM AREA E AND TRIBUTARY B DISCHARGE TO THE CATAWBA RIVER. SAMPLES COLLECTED IN THE CATAWBA RIVER UPSTREAM FROM AREA E AND ALONG THE RIVER ADJACENT TO AREA E SHOWED NO SIGNS OF ORGANIC CONTAMINATION. VOLATILIZATION AND DILUTION LIKELY REDUCED THE ORGANICS IN THE DISCHARGED GROUNDWATER TO UNDETECTABLE LEVELS.

THERE ARE THREE SURFACE WATER FEATURES AROUND AREA B: TRIBUTARY A ON THE EAST, TRIBUTARY C ON THE WEST, AND LONG CREEK TO THE SOUTH.

TRIBUTARY A, AS SHOWN IN FIGURE 9, FLOWS SOUTH OF AREA C AND INTO LONG CREEK. TWO SURFACE WATER AND TWO SEDIMENT SAMPLES WERE COLLECTED IN TRIBUTARY A.

DURING THE FIRST SAMPLING PERIOD, TRIBUTARY A, AT SAMPLING POINT TRIB A-1, WAS STAGNANT AND WAS MAINLY COMPOSED OF GROUNDWATER RECHARGE. THE FLOW RATE WAS MUCH GREATER FOR THE SECOND SAMPLING BECAUSE A STORM PRIOR TO SAMPLING INCREASED SURFACE WATER RUNOFF TO THE TRIBUTARY. GROUNDWATER RECHARGE FROM AREA C IS THE SUSPECTED SOURCE OF THE ORGANIC COMPOUNDS DETECTED IN TRIB A-1. THE DIFFERENCE IN CONCENTRATION BETWEEN THE FIRST AND SECOND SAMPLES IS PROBABLY THE RESULT OF DILUTION WITH SURFACE WATER RUNOFF DURING THE SECOND SAMPLING PERIOD. THE DOWNSTREAM SURFACE WATER SAMPLE TRIB A-2 WAS NOT CONTAMINATED. ORGANICS DETECTED UPSTREAM WERE LIKELY TO VOLATILIZE BEFORE REACHING THE DOWNSTREAM SAMPLING POINT.

TWO SEDIMENT AND SURFACE WATER SAMPLES WERE COLLECTED FROM TRIBUTARY B WHICH FLOWS THROUGH AREA E. ANALYSIS REVEALS THAT NEITHER THE UPSTREAM SURFACE WATER SAMPLE (TRIB B-1) OR THE DOWNSTREAM SAMPLE (TRIB B-2) IS CONTAMINATED WITH VOLATILE ORGANICS. BOTH SEDIMENT SAMPLES CONTAINED RELATIVELY LOW CONCENTRATIONS OF ANTHRACENE AND FLUORENE.

SEVEN SURFACE WATER SAMPLES FROM THE CATAWBA RIVER WERE COLLECTED AND ANALYZED FOR THE INDICATOR PARAMETERS; SAMPLES UPSTREAM AND DOWNSTREAM FROM THE SODYECO SITE WERE ALSO ANALYZED FOR THE HSL PARAMETERS. FIGURE 9 SHOWS THE LOCATION OF EACH SAMPLING POINT. VOLATILE ORGANICS WERE NOT DETECTED IN ANY OF THESE SAMPLES.

AIR QUALITY

AIR QUALITY MONITORING WAS CONDUCTED AS PART OF THIS INVESTIGATION. BASED ON MEASUREMENTS TAKEN DURING SAMPLING ACTIVITIES AND WORST CASE PREDICTED EMISSIONS, NO AIR QUALITY PROBLEMS ARE KNOWN OR EXPECTED TO EXIST. SINCE AREA D CONTAINED THE HIGHEST CONCENTRATION OF VOLATILE ORGANICS IN SOILS, ADDITIONAL AIR MONITORING AND FLUX ANALYSES WERE CONDUCTED IN THIS AREA TO DETERMINE A

MASS EMISSION RATE. USING A DISPERSION MODEL IN CONJUNCTION WITH SITE SPECIFIC WIND ROSE DATA, WORST CASE DOWNGRADE CONCENTRATIONS WERE ESTIMATED. ALL CONCENTRATIONS WERE WELL BELOW THE THRESHOLD LIMIT VALUE (TLV), WHICH ESTABLISHES ACCEPTABLE 8-HOUR EXPOSURE CONCENTRATIONS FOR HEALTH BASED STANDARDS.

3.3 RECEPTORS

GROUNDWATER IN THE SODYECO SITE AQUIFER IS CLASSIFIED AS CLASS IIA, A CURRENT SOURCE OF DRINKING WATER, USING THE USEPA GROUNDWATER CLASSIFICATIONS GUIDELINES OF DECEMBER, 1986. ALTHOUGH THE SITE AQUIFER IS NOT CURRENTLY USED FOR DRINKING WATER PURPOSES, POTENTIAL (FUTURE) USE WAS INCORPORATED IN THE BASELINE RISK ASSESSMENT. CONSIDERATION OF POTENTIAL GROUNDWATER USE IS CONSISTENT WITH 40 CFR 300.68(E)(2)(V).

GROUNDWATER HAS BEEN NOTED TO BE CONTAMINATED ON-SITE. GROUNDWATER ON-SITE MOVES WEST TO THE CATAWBA RIVER AND SOUTH-SOUTHEAST TO LONG CREEK, DISCHARGING TO THESE SURFACE WATER FEATURES. GROUNDWATER CONTAMINATION WAS NOTED PRINCIPALLY IN THE AREA SOUTH OF HIGHWAY 27 AND IN AREA E. NO DRINKING WATER WELLS CURRENTLY EXIST BETWEEN THESE AREAS AND GROUNDWATER DISCHARGE POINTS, THUS, PATHWAY COMPLETION VIA DOMESTIC WELL USAGE IS CURRENTLY INCOMPLETE.

FUGITIVE DUST GENERATIONS (FDG) IS CONSIDERED AN UNLIKELY EVENT. AREAS A AND B ARE CAPPED BY GRAVEL AND/OR CONCRETE; AREAS C AND E ARE WELL VEGETATED. AREA D IS IN A LOW LYING, GRASS COVERED AREA.

CONTAMINATED SOILS WILL CONTINUE TO LEACH TO SURROUNDING SOILS.

SURFACE RUNOFF FROM SURFACE SOILS MAY CONTAMINATE ADDITIONAL SOILS, ALTHOUGH CONCENTRATIONS WOULD NOT BE EXPECTED TO BE HIGH. TRACKING OF SOILS BY ON-SITE WORKERS MAY OCCUR IN AREAS C AND D.

VOLATILIZATION FROM CONTAMINATED SOILS AND SEDIMENTS IN AREAS C AND D MAY OCCUR. THIS MAY AFFECT ON-SITE WORKERS WITHIN THE ZONE OF INFLUENCE. VOLATILE ORGANIC CONTAMINANTS WERE FOUND IN SIGNIFICANT CONCENTRATIONS IN AREA D SOILS; LOWER LEVELS WERE FOUND IN AREA C. EMISSION LEVELS FROM AREA D WOULD BE EXPECTED TO BE MINIMAL AND WOULD QUICKLY DISSIPATE. EMISSIONS FROM AREA C WOULD BE EXPECTED TO BE UNDETECTABLE.

THE CATAWBA RIVER WAS FOUND TO HAVE SEVERAL POTENTIAL EXPOSURE PATHWAYS ASSOCIATED WITH IT. THE CATAWBA IS ROUTINELY USED FOR SWIMMING AND FISHING. THERE ARE SEVERAL INDUSTRIAL RIVER WATER INTAKES ACROSS THE CATAWBA RIVER FROM THE PLANT. SODYECO USES THE RIVER AS A SOURCE OF DRINKING WATER FOR THE PLANT AND FOR PROCESS WATER. WATER USED FOR DRINKING IS TREATED BY RAPID SAND FILTRATION, POLYMERIC COAGULATION AND CHLORINE. THE CITY OF BELMONT DRINKING WATER INTAKE IS LOCATED APPROXIMATELY 3 MILES DOWNSTREAM OF THE SITE. ALTHOUGH THERE WERE SEVERAL EXPOSURE POINTS IDENTIFIED, PATHWAY COMPLETION VIA THIS ROUTE IS NOT EXPECTED SINCE NO SURFACE WATER CONTAMINATION WAS FOUND IN THE RIVER. THE POSSIBILITY OF INGESTION OF FISH OR OTHER AQUATIC LIFE THAT HAD BIOACCUMULATED LOW (NON-DETECTABLE) LEVELS OF SITE CONTAMINANTS WAS CONSIDERED. HOWEVER, BCF VALUES ARE VERY LOW FOR THE SITE RELATED VOLATILE ORGANICS. THE THREE POLYNUCLEAR AROMATIC HYDROCARBONS (ANTHRACENE, FLUORENE AND PHENANTHRENE) HAVE ELEVATED BCF VALUES. HOWEVER, A REVIEW OF THE LITERATURE AND DISCUSSIONS WITH EXPERTS IN THE FIELD OF PAHS INDICATES THAT THESE COMPOUNDS DO NOT, IN GENERAL, BIOACCUMULATE IN VERTEBRATES SUCH AS FISH AND MAN.

THE FINAL POTENTIAL EXPOSURE PATHWAY PRESENTED CONSIDERS LOCAL WATERFOWL AND SMALL MAMMALS THAT MAY FREQUENT CONTAMINATED AREAS. THESE ANIMALS MAY RECEIVE EXPOSURE VIA INGESTION OR DERMAL CONTACT WITH SOILS AND SEDIMENTS. LOCAL RESIDENTS MAY THEN HUNT AND CONSUME THESE ANIMALS. THE PROBABILITY OF PATHWAY COMPLETION VIA THIS ROUTE IS VERY LOW AND DIFFICULT TO QUANTIFY.

4.0 CLEANUP CRITERIA

THE EXTENT OF CONTAMINATION WAS DEFINED IN SECTION 3.0, CURRENT SITE STATUS. THIS SECTION EXAMINES THE RELEVANCE AND APPROPRIATENESS OF WATER QUALITY CRITERIA UNDER THE CIRCUMSTANCES OF RELEASE OF CONTAMINANTS AT THIS SITE. BASED UPON CRITERIA FOUND TO BE RELEVANT AND APPROPRIATE, THE MINIMUM GOALS OF REMEDIAL ACTION AT THIS SITE HAVE BEEN DEVELOPED.

4.1 GROUNDWATER REMEDIATION

IN DETERMINING THE DEGREE OF GROUNDWATER CLEANUP, SECTION 121(D) OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) REQUIRES THAT THE SELECTED REMEDIAL ACTIONS ESTABLISH A LEVEL OR STANDARD OF CONTROL WHICH COMPLIES WITH ALL "APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)".

GROUNDWATER IN THE AREA IS CLASSIFIED AS CLASS II A, A CURRENT SOURCE OF DRINKING WATER, USING THE USEPA GROUNDWATER CLASSIFICATIONS GUIDELINES OF DECEMBER, 1986. A SURVEY WAS MADE OF EXISTING OFF-SITE WATER SUPPLY WELLS WITHIN A ONE-HALF MILE RADIUS OF THE SODYECO CERCLA FACILITIES ON THE EAST SIDE OF THE CATAWBA RIVER. (THE CATAWBA RIVER ACTS AS A GROUNDWATER DIVIDE.). A CONVENIENCE STORE, LOCATED NORTH OF THE PLANT, RECEIVES WATER FROM THE SODYECO WATER SUPPLY SYSTEM. A GAS STATION (OWNED BY SANDOZ) HAS A WELL THAT PROVIDES WATER FOR A MINNOW TANK. THE POTABLE WATER USED BY THE GAS STATION IS PROVIDED BY THE SODYECO PLANT. AN UPHOLSTERY SHOP, OWNED BY SANDOZ, HAS A WELL THAT IS USED ONLY FOR SANITARY FACILITIES.

THERE ARE SEVEN WELLS SUPPLYING WATER TO TWELVE BUILDINGS WITHIN A ONE-HALF MILE RADIUS OF THE SITE (ALL UPGRADIENT) (FIGURE 10). ONE WELL IS A COMMUNITY WELL WHICH SUPPLIES WATER TO SEVEN HOUSES; ONE RESIDENCE HAS TWO WELLS; AND THE OTHER WELLS SERVE SINGLE RESIDENCES. THE NEAREST DOMESTIC WELLS TO THE CERCLA SITES ARE ABOUT 1300 FEET NORTHEAST (NEAR HIGHWAY 27) AND ABOUT 3000 FEET SOUTHEAST (ALONG BELMEADE ROAD), BOTH HYDROLOGICALLY UPGRADIENT FROM THE CERCLA SITES.

THE VALUE TO SOCIETY OF CLASS IIA GROUNDWATER RESOURCES SUPPORTS RESTORATION OF THIS CONTAMINATED GROUNDWATER TO LEVELS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. BASED UPON GROUNDWATER CLASSIFICATION, REMEDIATION OF THE GROUNDWATER TO REDUCE CONTAMINANTS TO LEVELS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT WOULD BE NECESSARY. GROUNDWATER CLEANUP GOALS GIVEN IN TABLE 1 MEET THESE REQUIREMENTS.

FUTURE EXPOSURE TO CONTAMINATED GROUNDWATER WAS ESTIMATED BASED ON THE POSSIBILITY OF A WELL BEING PLACED ON THE SITE AND PRODUCING WATER CONTAINING THE MAXIMUM LEVELS OF CONTAMINANTS WHICH WERE DETECTED IN MONITORING WELLS DURING THE REMEDIAL INVESTIGATION. LIFETIME CANCER RISKS WERE CALCULATED UNDER THESE ASSUMPTIONS FOR THE INDICATOR CHEMICALS IDENTIFIED IN THE PUBLIC HEALTH EVALUATION (PHE). EPA'S DRAFT "GUIDANCE ON REMEDIAL ACTIONS FOR CONTAMINATED GROUNDWATER AT SUPERFUND SITES" (OCTOBER 1986) SPECIFIES THAT GROUNDWATER REMEDIATION SHOULD ACHIEVE A LEVEL OF PROTECTION IN THE 10-4 TO 10-7 EXCESS CANCER RISK RANGE, WITH 10-6 BEING THE NOMINAL ACCEPTABLE LIFETIME VALUE. LARGER VALUES PRESENT AN UNACCEPTABLE RISK FROM EXPOSURE. BECAUSE SECTION 121 OF SARA REQUIRES CONSIDERATION OF POTENTIAL AS WELL AS CURRENT GROUNDWATER USE, THE LEVELS OF CONTAMINANTS IN THE GROUNDWATER MUST BE REDUCED TO ACCEPTABLE LEVELS.

THE CONCLUSION OF THE ABOVE DISCUSSION IS THAT A NO-ACTION ALTERNATIVE FOR GROUNDWATER WOULD BE OUT OF COMPLIANCE WITH SECTION 121 OF SARA, WHICH REQUIRES CLEANUP OF CONTAMINATED GROUNDWATER TO LEVELS WHICH ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. CLASSIFICATION OF THE GROUNDWATER AND THE POTENTIAL FUTURE USE OF THE GROUNDWATER INDICATES THAT PRESENT CONTAMINANT LEVELS IN THE GROUNDWATER ARE NOT ACCEPTABLE.

INDICATOR CHEMICALS WERE USED TO ESTABLISH CLEANUP GOALS FOR GROUNDWATER. INDICATOR CHEMICALS WERE SELECTED BASED ON THE RESULTS OF PREVIOUS SAMPLING ACTIVITIES AND THE CURRENT RI RESULTS. ALL INDICATOR CHEMICALS ANALYZED FOR IN THE RI WERE UTILIZED IN THE PUBLIC HEALTH EVALUATION.

GROUNDWATER IS NOT USED BY HUMAN RECEPTORS DOWNGRADIENT OF THE SITE. GROUNDWATER FROM THE SITE DISCHARGES TO LONG CREEK OR THE CATAWBA RIVER, AND THERE ARE NO INTERMEDIATE USERS.

LEVELS PRESENTED AS GROUNDWATER CLEANUP GOALS ARE BASED ON THE FOLLOWING CRITERIA: DRINKING WATER MAXIMUM CONTAMINANT LEVELS (MCLS) AND MAXIMUM CONTAMINANT LEVEL GOALS (MCLGS), FEDERAL AMBIENT WATER QUALITY CRITERIA, NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS), AND STATE ENVIRONMENTAL STANDARDS. INDICATOR CHEMICALS, MAXIMUM CONCENTRATIONS DETECTED IN GROUNDWATER AT THE SODYECO SITE, AND THE CLEANUP GOALS FOR THESE CHEMICALS ARE PRESENTED IN TABLE 1.

4.2 SOIL REMEDIATION

THE PUBLIC HEALTH ASSESSMENT IN THE RI REPORT DETERMINED THAT RISKS TO HUMAN HEALTH AS A RESULT OF EXPOSURE TO ON-SITE CONTAMINANTS VIA INHALATION, INGESTION, AND DERMAL CONTACT ARE LOW UNDER PRESENT USE CONDITIONS AT THE SITE. FOR POTENTIAL FUTURE USE SCENARIOS, THE RISK IS HIGHER. THEREFORE, REMEDIATION OR INSTITUTIONAL CONTROLS WILL BE UNDERTAKEN TO ASSURE THAT AN INCREASED RISK TO HUMAN HEALTH IS NOT POSED IN THE FUTURE.

CONTAMINANTS REMAINING IN THE SOIL FOLLOWING GROUNDWATER REMEDIATION MAY, OVER TIME, LEACH INTO THE GROUNDWATER. THEREFORE, THE SOILS AND THE LEACHATE FROM THE CONTAMINATED SOILS WILL BE SAMPLED AND ANALYZED FOR THE INDICATOR COMPOUNDS AND THE SOILS WILL BE TREATED UNTIL THE LEACHATE MEETS THE ARARS.

4.3 SURFACE WATER REMEDIATION

THE CONTAMINANT LEVELS IN THE SURFACE WATER (TRIBUTARIES A, B AND LONG CREEK) ARE EXPECTED TO DECLINE, AS GROUNDWATER AND SOIL REMEDIATION CONTINUES. THUS, IT WAS CONCLUDED THAT REMEDIATION OF SURFACE WATER IS NOT NECESSARY. NO SURFACE WATER CONTAMINATION WAS DETECTED IN THE CATAWBA RIVER.

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5.0 ALTERNATIVES EVALUATION

THE PURPOSE OF REMEDIAL ACTION AT THE SODYECO SITE IS TO MITIGATE AND MINIMIZE CONTAMINATION IN THE SOILS AND GROUNDWATER, AND TO REDUCE POTENTIAL RISKS TO HUMAN HEALTH AND THE ENVIRONMENT. THE FOLLOWING CLEANUP OBJECTIVES WERE DETERMINED BASED ON REGULATORY REQUIREMENTS AND LEVELS OF CONTAMINATION FOUND AT THE SITE:

- TO PROTECT THE HUMAN HEALTH AND THE ENVIRONMENT FROM EXPOSURE TO CONTAMINATED ON-SITE SOILS THROUGH INHALATION OR DIRECT CONTACT.
- TO RESTORE CONTAMINATED GROUNDWATER TO LEVELS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

AN INITIAL SCREENING OF POSSIBLE TECHNOLOGIES WAS PERFORMED TO IDENTIFY THOSE WHICH BEST MEET THE CRITERIA OF SECTION 300.68 OF THE NATIONAL CONTINGENCY PLAN (NCP) (TABLES 2 & 3).

FOLLOWING THE INITIAL SCREENING OF TECHNOLOGIES, POTENTIAL REMEDIAL ACTION ALTERNATIVES WERE IDENTIFIED AND ANALYZED (TABLE 4).

THESE ALTERNATIVES WERE FURTHER SCREENED AND THOSE WHICH BEST SATISFIED THE CLEANUP OBJECTIVES, WHILE ALSO BEING COST EFFECTIVE AND TECHNICALLY FEASIBLE, WERE DEVELOPED FURTHER (TABLE 5).

5.1 ALTERNATIVES

ALTERNATIVE 1: NO ACTION

THIS ALTERNATIVE WILL EVENTUALLY REDUCE THE VOLUME OF SOIL CONTAMINATION THROUGH NATURAL FLUSHING. CONTAMINANT MOBILITY AND TOXICITY ARE NOT REDUCED IN THE ABSENCE OF TREATMENT. GIVEN THE CONTAMINANT CONCENTRATIONS AT THE SITE, THE TIME REQUIRED TO SIGNIFICANTLY REDUCE CONTAMINANT LEVELS IS UNREALISTIC. NO ACTION DOES NOT PROVIDE PERMANENT SOURCE CONTROL.

ALTERNATIVE 2: NATURAL SOIL FLUSHING AREAS B, C, D GROUNDWATER RECOVERY AND TREATMENT AREAS A - E

THIS ALTERNATIVE DOES NOT EMPLOY A SOIL TECHNOLOGY AND, THEREFORE, THE EXPOSURE PATHWAYS AND ASSOCIATED RISK ARE THE SAME AS FOR THE BASELINE NO-ACTION ALTERNATIVE. IN THE ABSENCE OF SOURCE CONTROL MEASURES, THE TIME REQUIRED TO PUMP AND TREAT THE GROUNDWATER IS UNREALISTIC.

THIS ALTERNATIVE AND THE OTHERS THAT WILL BE DESCRIBED BELOW, REQUIRES THE COLLECTION OF THE GROUNDWATER THROUGH A SERIES OF RECOVERY WELLS TO INTERCEPT THE CONTAMINANT PLUME IN EACH AREA BEFORE IT REACHES LONG CREEK OR THE CATAWBA RIVER.

THE BIOLOGICAL DEGRADATION AND AERATION OF THE GROUNDWATER IN SODYECO'S EXISTING FACILITY WAS CHOSEN AS THE BEST GROUNDWATER ALTERNATIVE. IT WILL BE EASY TO IMPLEMENT SINCE ALL THAT IS REQUIRED IS THE CONNECTION OF THE CERCLA GROUNDWATER COLLECTION SYSTEM TO THE EXISTING SEWERAGE SYSTEM. ORGANIC COMPOUNDS IN THE GROUNDWATER WILL BE BIODEGRADED BY THE MICROORGANISMS PRESENT IN THE AERATION LAGOON; A PORTION OF THE ORGANICS WILL BE VOLATILIZED AS A RESULT OF AERATION. THIS TREATMENT SYSTEM IS MORE THAN 98 PERCENT EFFICIENT BASED ON THE REMOVAL OF O-DICHLOROBENZENE. OF THE ORGANIC CONTAMINANTS, O-DICHLOROBENZENE IS THE MOST DIFFICULT TO REMOVE. REMOVAL EFFICIENCIES NEAR 99 PERCENT ARE EXPECTED FOR THE OTHER COMPOUNDS. THE TREATED

GROUNDWATER WILL THEN BE DISCHARGED TO THE CATAWBA RIVER UNDER THE NPDES PERMIT FOR THE FACILITY. THE CERCLA INFLUENT AND THE TOTAL EFFLUENT WILL BE SAMPLED PERIODICALLY TO MONITOR THE EFFECTIVENESS OF THE TREATMENT.

ALTERNATIVE 6: CAP AREA B
EXCAVATE AREAS C AND D
INCINERATE EXCAVATED MATERIALS ON-SITE
GROUNDWATER RECOVERY AND TREATMENT AREAS A - E

APPROXIMATELY 6,000 CUBIC YARDS OF SOIL WILL BE EXCAVATED FOR INCINERATION. INCINERATION IS A PROVEN METHOD FOR DESTRUCTION OF ORGANIC CONTAMINANTS. THIS METHOD PROVIDES THE SAME BASIC LEVEL OF PROTECTION AS OTHER TREATMENT TECHNOLOGIES CONSIDERED, HOWEVER, THE COST IS PROHIBITIVE.

AREA B IN THIS END THE OTHER REMAINING ALTERNATIVES WILL BE A CAP CONSISTING OF 3 INCHES OF ASPHALT, 2 INCHES OF BINDER-BITUMINOUS CONCRETE AND A 9 INCH GRAVEL BASE.

ALTERNATIVE 8: CAP AREA B
EXCAVATION AND TREATMENT OF AREAS C AND D SOILS
GROUNDWATER RECOVERY AND TREATMENT AREAS A - E

THIS ALTERNATIVE RECOMMENDS THE EXCAVATION AND TREATMENT OF CONTAMINATED SOILS IN AREAS C & D BY THERMAL PROCESSING. THE TREATED SOILS WOULD THEN BE BACKFILLED AND THE AREA WOULD BE REGRADED.

ALTERNATIVE 9: CAP AREA B
TREATMENT OF AREA C SOILS
EXCAVATE AREA D AND INCINERATE OFF-SITE
GROUNDWATER RECOVERY AND TREATMENT AREAS A - E

THE EXCAVATION AND OFF-SITE INCINERATION FROM AREA D (APPROXIMATELY 150 CUBIC YARDS) WILL EFFECTIVELY ELIMINATE THE AREA THAT CONTAINS THE HIGHEST LEVEL OF CONTAMINATION. THE AREA WILL BE BACKFILLED WITH CLEAN, LOW PERMEABILITY SOIL AND REGRADED. OFF-SITE INCINERATION IS COST EFFECTIVE GIVEN THE SMALL VOLUME OF MATERIAL FROM AREA D.

FOUR DIFFERENT INNOVATIVE TECHNOLOGIES WILL BE SUBJECTED TO TREATABILITY STUDIES TO DETERMINE THE MOST EFFECTIVE TREATMENT TECHNOLOGY, I.E., THE TECHNOLOGY THAT IS MOST EFFECTIVE IN REMOVING THE CONTAMINANTS WITHIN A REASONABLE TIME FRAME. THESE ARE:

- 1) FLUSHING - IN SITU PERCOLATION OF WATER THROUGH CONTAMINATED SOILS TO SOLUBILIZE ADSORBED COMPOUNDS AND REDUCE RESIDUAL CONCENTRATIONS. WATER WOULD BE INTRODUCED THROUGH A HEADER SYSTEM AND RECOVERED THROUGH A SERIES OF WELLS.
- 2) SOIL WASHING - PLACE EXCAVATED, SCREENED SOILS AND WASH WATER IN A FLOTATION MACHINE WITH A MECHANICAL IMPELLER FOR MIXING. TREAT WITHDRAWN LEACHATE IN THE EXISTING WASTEWATER TREATMENT FACILITY WITH RECOVERED GROUNDWATER.
- 3) THERMAL PROCESSING - PLACE EXCAVATED SOILS IN A HEAT EXCHANGER (THERMAL PROCESSOR) TO VOLATILIZE ORGANICS. VAPORS ARE TREATED IN AN AFTER BURNER OR TREATED OTHERWISE AS NECESSARY.
- 4) IN-SITU STEAM STRIPPING - IN-SITU STEAM INJECTION THROUGH BLADED DRILLING EQUIPMENT TO VOLATILIZE ORGANICS. VAPORS ARE COLLECTED, TREATED, AND REINJECTED FOR CLOSED-LOOP OPERATION.

ALTERNATIVE 10: CAP AREA B
NATURAL FLUSHING AREA C
EXCAVATE AREA D AND INCINERATE OFF-SITE
GROUNDWATER RECOVERY AND TREATMENT AREAS A-E

THIS ALTERNATIVE PROPOSES NO ACTION FOR THE CONTAMINATED SOILS IN AREA C. THEREFORE, THE EXPOSURE PATHWAYS AND ASSOCIATED RISK WOULD NOT BE REDUCED. SINCE THE SOURCE OF GROUNDWATER CONTAMINATION WOULD STILL BE PRESENT, A LONGER PERIOD TO PUMP AND TREAT THE GROUNDWATER IN AREA C WOULD BE REQUIRED.

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6.0 RECOMMENDED ALTERNATIVES

6.1 DESCRIPTION OF RECOMMENDED REMEDY

THE RECOMMENDED ALTERNATIVES FOR REMEDIATION OF GROUNDWATER AND SOIL CONTAMINATION AT THE SODYECO SITE INCLUDE EXTRACTION, TREATMENT AND DISCHARGE OF GROUNDWATER; EXCAVATION AND OFF-SITE INCINERATION; CAPPING; AND ON-SITE TREATMENT OF CONTAMINATED SOIL. (ALTERNATIVE 9).

TREATABILITY STUDIES WILL BE PERFORMED FOR THE CONTAMINATED SOILS IN AREA C TO DETERMINE THE TREATMENT SYSTEM WHICH WILL BE USED. THE SYSTEMS TO BE EVALUATED ARE: 1) FLUSHING; 2) SOIL WASHING; 3) THERMAL PROCESSING AND 4) IN-SITU STEAM STRIPPING. THE CONTAMINATED SOILS IN AREA D WILL BE EXCAVATED AND INCINERATED OFF-SITE. AREA B WILL BE CAPPED WITH ASPHALT.

GROUNDWATER WILL BE EXTRACTED THROUGH RECOVERY WELLS, AND TRANSPORTED THROUGH THE PLANT'S SEWER SYSTEM TO THE ON-SITE WASTEWATER TREATMENT FACILITY.

THESE RECOMMENDED ALTERNATIVES MEET THE REQUIREMENTS OF THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (NCP), 40 CFR 300.68(J), AND THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA). THIS RECOMMENDED REMEDY PERMANENTLY AND SIGNIFICANTLY REDUCES THE VOLUME OF HAZARDOUS SUBSTANCES IN THE GROUNDWATER, AND REDUCES THE VOLUME AND/OR MOBILITY OF CONTAMINANTS IN THE SOIL.

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6.2 OPERATION AND MAINTENANCE

WHEN THE REMEDY IS COMPLETED, LONG-TERM OPERATION AND MAINTENANCE (O&M) WILL BE REQUIRED ON THE ASPHALT CAP. LONG-TERM GROUNDWATER MONITORING WILL BE REQUIRED TO ASSURE THE EFFECTIVENESS AND PERMANENCE OF THE OTHER SOIL AND GROUNDWATER REMEDIES.

6.3. COST OF RECOMMENDED ALTERNATIVES

CAPITAL COSTS FOR GROUNDWATER REMEDIATION IS \$335,000 WITH SYSTEM OPERATING AND MAINTENANCE COST AT \$80,000 PER YEAR, WHICH INCLUDES SAMPLING AND ANALYSIS. THE TOTAL PRESENT WORTH COST OF THE GROUNDWATER REMEDIATION IS \$1,016,000.

CAPPING OF AREA B IS ESTIMATED AT \$378,000 INCLUDING O&M FOR 20 YEARS. EXCAVATION AND OFF-SITE INCINERATION OF CONTAMINATED SOILS IN AREA D IS ESTIMATED AT \$173,000. THE TREATMENT OF AREA C SOILS, INCLUDING THE TREATABILITY STUDIES WILL RANGE FROM \$634,000 TO \$2,505,000 DEPENDING ON WHICH TECHNOLOGY IS USED. THESE COSTS INCLUDE ENGINEERING, OVERHEAD, PROFIT, CONTINGENCY AND ADMINISTRATION FEES.

THE TOTAL PRESENT WORTH COST OF THIS REMEDY, INCLUDING BOTH SOIL AND GROUNDWATER REMEDIATION, WILL RANGE FROM \$2,089,000 TO \$3,865,000.

#SCH

6.4 SCHEDULE

THE PLANNED SCHEDULE FOR REMEDIAL ACTIVITIES AT THE SODYECO SITE WILL BE GOVERNED BY RCRA PERMITTING REQUIREMENTS, BUT TENTATIVELY IS AS FOLLOWS:

SEPTEMBER 1987	- APPROVE RECORD OF DECISION
DECEMBER 1987	- BEGIN REMEDIAL DESIGN/TREATABILITY STUDIES
MARCH 1988	- INSTALL RECOVERY WELLS
AUGUST 1988	- COMPLETE TREATABILITY STUDIES
NOVEMBER 1988	- COMPLETE REMEDIAL DESIGN AND BEGIN MOBILIZATION.

#FA

6.5 FUTURE ACTIONS

FOLLOWING COMPLETION OF REMEDIAL ACTIVITIES, LONG-TERM GROUNDWATER MONITORING WILL BE REQUIRED TO ASSURE THE EFFECTIVENESS OF THE GROUNDWATER CLEANUP. MAINTENANCE OF THE ASPHALT CAPS ON AREAS A & B WILL CONTINUE.

6.6 CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

REMEDIAL ACTIONS PERFORMED UNDER CERCLA MUST COMPLY WITH ALL APPLICABLE FEDERAL AND STATE REGULATIONS. ALL ALTERNATIVES CONSIDERED FOR THE SODYECO SITE WERE EVALUATED ON THE BASIS OF THE DEGREE TO WHICH THEY COMPLIED WITH THESE REGULATIONS. THE RECOMMENDED ALTERNATIVES WERE FOUND TO MEET OR EXCEED ALL APPLICABLE ENVIRONMENTAL LAWS, AS DISCUSSED BELOW:

- RESOURCE CONSERVATION AND RECOVERY ACT

THE RECOMMENDED REMEDY WILL BE INCORPORATED INTO SODYECO'S RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) PART B PERMIT. THE INCINERATION WILL BE CONDUCTED OFF-SITE AT A PERMITTED FACILITY.

- CLEAN WATER ACT

TRACE AMOUNTS OF CONTAMINATION WERE DETECTED IN SURFACE WATER. THE SOIL AND GROUNDWATER REMEDIATION WILL RESULT IN AN END TO THE WATER CONTAMINATION.

- FLOODPLAIN MANAGEMENT EXECUTIVE ORDER 11988

THE CERCLA AREAS DO NOT LIE WITHIN A FLOODPLAIN AND THUS ARE NOT SUBJECT TO THE REQUIREMENTS OF E. O. 11988.

- DEPARTMENT OF TRANSPORTATION

TRANSPORT OF HAZARDOUS SUBSTANCES IS REGULATED BY THE DEPARTMENT OF TRANSPORTATION (DOT). MATERIAL TRANSPORTED TO THE INCINERATION FACILITY WILL FOLLOW DOT REGULATIONS GOVERNING ITS SHIPMENT.

- OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

A HEALTH AND SAFETY PLAN WILL BE DEVELOPED DURING REMEDIAL DESIGN AND WILL BE FOLLOWED DURING FIELD ACTIVITIES TO ASSURE THAT REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) ARE FOLLOWED.

- SAFE DRINKING WATER ACT

MAXIMUM CONTAMINANT LEVELS (MCLS) ESTABLISHED UNDER THE SAFE DRINKING WATER ACT WERE FOUND TO BE RELEVANT AND APPROPRIATE TO REMEDIAL ACTION AT THE SODYECO SITE. THE CLEANUP GOALS FOR GROUNDWATER WERE ESTABLISHED IN SECTION 4.

- NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

DISCHARGE OF TREATED GROUNDWATER IS PART OF THE RECOMMENDED REMEDIAL ALTERNATIVE. THIS DISCHARGE WILL MEET EFFLUENT LIMIT REQUIREMENTS OF THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). AQUATIC LIFE CHRONIC TOXICITY VALUES, WHICH ARE USED IN THE NPDES PERMITTING SYSTEM, WERE USED IN DETERMINING THE GROUNDWATER CLEANUP GOALS IN SECTION 4.

- ENDANGERED SPECIES ACT

THE RECOMMENDED REMEDIAL ALTERNATIVE IS PROTECTIVE OF SPECIES LISTED AS ENDANGERED OR THREATENED UNDER THE ENDANGERED SPECIES ACT. REQUIREMENTS OF THE INTERAGENCY SECTION 7 CONSULTATION PROCESS, 50 CFR, PART 402, WILL BE MET. THE DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE, WILL BE CONSULTED DURING REMEDIAL DESIGN TO ASSURE THAT ANY ENDANGERED OR THREATENED SPECIES, IF IDENTIFIED, ARE NOT ADVERSELY IMPACTED BY IMPLEMENTATION OF THIS REMEDY.

- AMBIENT AIR QUALITY STANDARDS

THE SOIL AND GROUNDWATER TREATMENT SYSTEMS WILL BE DESIGNED AND MONITORED TO ASSURE THAT AIR EMISSIONS MEET ALL STATE AND FEDERAL STANDARDS.

- STATE DRINKING WATER STANDARDS

MAXIMUM CONTAMINANT LEVELS ESTABLISHED BY THE STATE OF NORTH CAROLINA REGULATIONS ARE ADOPTED FROM THOSE OF THE FEDERAL SAFE DRINKING WATER ACT, AND WILL BE MET.

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7.0 COMMUNITY RELATIONS

FACT SHEETS WERE TRANSMITTED TO INTERESTED PARTIES, RESIDENTS NEAR THE SITE, MEDIA AND STATE, LOCAL AND FEDERAL OFFICIALS BEFORE THE RI WORK BEGAN AT THE SITE IN AUGUST 1986.

TWO INFORMATION REPOSITORIES WERE ESTABLISHED, ONE IN MT. HOLLY NEAR THE SITE AND ONE IN THE CITY OF CHARLOTTE.

A PUBLIC MEETING WAS HELD ON AUGUST 19, 1987, AT THE IDA RANKIN ELEMENTARY SCHOOL IN MT. HOLLY TO DISCUSS THE RESULTS OF THE REMEDIAL INVESTIGATION AND THE ALTERNATIVES FROM THE FEASIBILITY STUDY. EPA DISCUSSED THE PREFERRED REMEDIAL ALTERNATIVE. TWO COMMENTS (ONE ORAL AT THE MEETING, AND ONE IN WRITING DURING THE COMMENT PERIOD) WERE RECEIVED ON AN OZONATION TREATMENT PROCESS. NO OTHER COMMENTS IN REGARD TO ANY OF THE ALTERNATIVES WERE RECEIVED DURING THE THREE-WEEK PUBLIC COMMENT PERIOD WHICH ENDED SEPTEMBER 9, 1987.

THE PUBLIC DID SHOW A DESIRE FOR REMEDIATION OF THE SITE. NO OPPOSITION FROM THE PUBLIC IS EXPECTED IF THE RECOMMENDED REMEDIAL ALTERNATIVE IS IMPLEMENTED.

A RESPONSIVENESS SUMMARY HAS BEEN PREPARED TO SUMMARIZE COMMUNITY CONCERNS AND EPA'S COMMUNITY RELATIONS ACTIVITIES.

#TMA

TABLES, MEMORANDA, ATTACHMENTS

#RS

SODYECO SITE, CHARLOTTE, NORTH CAROLINA

RESPONSIVENESS SUMMARY

THIS COMMUNITY RELATIONS RESPONSIVENESS SUMMARY IS DIVIDED INTO THE FOLLOWING SECTIONS:

SECTION I. OVERVIEW. THIS SECTION DISCUSSES EPA'S PREFERRED ALTERNATIVE FOR REMEDIAL ACTION AND LIKELY PUBLIC REACTION TO THIS ALTERNATIVE.

SECTION II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS. THIS SECTION PROVIDES A BRIEF HISTORY OF COMMUNITY INTEREST AND CONCERNS RAISED DURING REMEDIAL PLANNING ACTIVITIES AT THE SODYECO SITE.

SECTION III. SUMMARY OF MAJOR COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND THE EPA RESPONSES TO THE COMMENTS. BOTH THE COMMENT AND EPA'S RESPONSE ARE PROVIDED.

SECTION IV. REMAINING CONCERNS. THIS SECTION DESCRIBES REMAINING COMMUNITY CONCERNS THAT EPA SHOULD BE AWARE OF IN CONDUCTING THE REMEDIAL DESIGN AND REMEDIAL ACTION AT THE SODYECO SITE.

IN ADDITION TO THE ABOVE SECTIONS, ATTACHMENT A, INCLUDED AS PART OF THIS RESPONSIVENESS SUMMARY, IDENTIFIES THE COMMUNITY RELATIONS ACTIVITIES CONDUCTED BY EPA DURING REMEDIAL RESPONSE ACTIVITIES AT THE SODYECO SITE.

1. OVERVIEW

AT THE TIME OF THE PUBLIC MEETING AND THE BEGINNING OF THE PUBLIC COMMENT PERIOD, EPA PRESENTED ITS PREFERRED ALTERNATIVE TO THE PUBLIC. THIS ALTERNATIVE ADDRESSES BOTH THE SOIL AND GROUNDWATER CONTAMINATION PROBLEMS AT THE SITE. THE PREFERRED ALTERNATIVE SPECIFIED IN THE RECORD OF DECISION (ROD) INCLUDES: TREATMENT OF CONTAMINATED GROUNDWATER, TREATMENT OF CONTAMINATED SOIL, OFF-SITE INCINERATION OF HIGHLY CONTAMINATED SOIL, AND ON-SITE ASPHALT CAP OF AN ABANDONED LANDFILL.

THE COMMUNITY, IN GENERAL, FAVORS REMEDIAL ACTION THOUGH FEW EXPRESSED A PREFERENCE FOR A PARTICULAR PROCESS.

2. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

THE SODYECO SITE IS LOCATED IN A PREDOMINANTLY RURAL AREA OF MECKLENBURG COUNTY AND COMMUNITY INTEREST HAS BEEN LOW. ACCORDING TO LOCAL OFFICIALS, COMMUNITY INTEREST IN THE SODYECO SITE BEGAN IN THE 1960S WHEN AREA RESIDENTS BECAME CONCERNED ABOUT THE EFFECTS OF BURNING SOLVENT WASTES ON AIR QUALITY. WHEN SODYECO TERMINATED THE PRACTICE OF OPEN BURNING IN THE LATE 1960S, COMMUNITY INTEREST DECREASED SIGNIFICANTLY.

THE MECKLENBURG HEALTH DEPARTMENT RECEIVED ONE CALL FROM A RESIDENT CONCERNED ABOUT HIS WELL WATER. IN ADDITION, THE NORTH CAROLINA HUMAN RESOURCES DEPARTMENT RECEIVED A CALL FROM A RESIDENT CONCERNED ABOUT GEESE THAT WERE SWIMMING IN ONE OF THE SODYECO SETTLING PONDS. HE LATER RECEIVED INFORMATION THAT SATISFIED HIS CONCERNS.

THE CLEAN WATER FUND OF NORTH CAROLINA HAD ALSO EXPRESSED AN INTEREST IN KEEPING THE LOCAL RESIDENTS INFORMED BY PROVIDING THEM WITH ADDITIONAL INFORMATION.

3. SUMMARY OF PUBLIC COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND AGENCY RESPONSES.

COMMENTS RAISED DURING THE SODYECO PUBLIC MEETING AND PUBLIC COMMENT PERIOD ARE SUMMARIZED BRIEFLY BELOW. THE COMMENT PERIOD WAS HELD FROM AUGUST 19 TO SEPTEMBER 9, 1987 TO RECEIVE COMMENTS FROM THE PUBLIC ON THE DRAFT FEASIBILITY STUDY.

1. TWO SEPARATE COMPANIES SUGGESTED AN OZONATION PROCESS TO TREAT THE ORGANIC DYE WASTES AT THE SODYECO SITE.

EPA RESPONSE: EPA FOLLOWED UP BY REQUESTING THAT THE PRP'S CONTRACTOR, ENGINEERING SCIENCE, FOLLOW UP THIS SUGGESTION BY OBTAINING INFORMATION ON THE PROCESS, AND BY VISITING A LOCAL OPERATION USING THE PROCESS. THE CONCLUSION WAS THAT THE PROCESS WAS NOT APPLICABLE AT THIS TIME FOR THE COMPOUNDS IDENTIFIED AT THE SODYECO SITE. THE PRIMARY WASTE BEING TREATED BY THIS PROCESS TO DATE HAS BEEN CREOSOTE FROM WOOD TREATING OPERATIONS.

2. ONE AREA RESIDENT EXPRESSED CONCERN ABOUT THE TREATED WATER BEING DISCHARGED INTO THE CATAWBA RIVER.

EPA RESPONSE: THE RESIDENT, A FORMER SODYECO EMPLOYEE, WAS DIRECTED TO THE INFORMATION REPOSITORY FOR ADDITIONAL INFORMATION AND WAS ASSURED THAT THE WATER BEING DISCHARGED WOULD COMPLY WITH THE PLANT'S CURRENT NPDES PERMIT.

3. ONE RESIDENT EXPRESSED CONCERN AT THE PUBLIC ABOUT THE PLANT CONTAMINATION MIGRATING TOWARD HIS PRIVATE WELL.

EPA RESPONSE: A REPRESENTATIVE FROM EPA'S WATER DIVISION EXPLAINED TO THE RESIDENT THAT THE CONTAMINATED GROUNDWATER WAS FLOWING AWAY FROM HIS WELL, NOT TOWARDS IT.

4. ONE RESIDENT DURING THE PUBLIC MEETING EXPRESSED CONCERN ABOUT SOME 1961 DATA THAT SHOWED THAT THE CITY OF BELMONT'S WATER SUPPLY (OFF THE CATAWBA RIVER) HAD AN ELEVATED LEVEL OF PHENOL.

EPA RESPONSE: BELMONT'S CURRENT WATER INTAKE ON THE CATAWBA RIVER IS OVER THREE MILES DOWNSTREAM FROM THE PLANT SITE. SAMPLES OF THE CATAWBA RIVER WATER NEAR THE PLANT DID NOT SHOW ANY TRACES OF PHENOL.

4. REMAINING PUBLIC CONCERNS

NO ADDITIONAL PUBLIC CONCERNS WERE LEFT UNRESOLVED.

ATTACHMENT A

**COMMUNITY RELATIONS ACTIVITIES CONDUCTED
AT THE SODYECO SITE**

COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE SODYECO SITE TO DATE INCLUDE THE FOLLOWING:

- EPA CONDUCTED COMMUNITY INTERVIEWS WITH LOCAL OFFICIALS AND INTERESTED RESIDENTS (MAY 1986)
- EPA PREPARED COMMUNITY RELATIONS PLAN (AUGUST 1986)
- EPA PREPARED AND DISTRIBUTED FACT SHEET ON SUPERFUND AND BACKGROUND OF SITE (AUGUST 1986)
- TWO INFORMATION REPOSITORIES WERE ESTABLISHED; ONE AT THE MT. HOLLY PUBLIC LIBRARY AND ONE AT THE CHARLOTTE PUBLIC LIBRARY (AUGUST 1986)
- PRESS RELEASE ISSUED ANNOUNCING PUBLIC MEETING AND PUBLIC COMMENT PERIOD (AUGUST 1987)
- FEASIBILITY STUDY RELEASED FOR PUBLIC REVIEW AND COMMENT (AUGUST 1987)
- EPA HELD A PUBLIC HEARING AT THE IDA RANKIN ELEMENTARY SCHOOL IN MT. HOLLY TO DESCRIBE THE RI AND FS RESULTS AND TO RESPOND TO CITIZENS' QUESTIONS. APPROXIMATELY 60 PEOPLE ATTENDED INCLUDING CITIZENS, SODYECO EMPLOYEES, ELECTED OFFICIALS, AND MEDIA FROM AREA TELEVISION STATIONS AND NEWSPAPERS. (AUGUST 19, 1987). A TRANSCRIPT OF THIS MEETING IS AVAILABLE.
- THE COMMENT PERIOD LASTED THREE WEEKS, FROM AUGUST 19 TO SEPTEMBER 9, 1987. COMMENTS RECEIVED BY EPA WERE ADDRESSED.
- THE ADMINISTRATIVE RECORD FOR THIS REMEDIAL SELECTION IS LOCATED IN ATLANTA AND THE MT. HOLLY PUBLIC LIBRARY.

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES
DIVISION OF HEALTH SERVICES

SEPTEMBER 14, 1987

MS. GIEZELLE S. BENNETT
COMPLIANCE PROJECT OFFICER
US EPA ERRB/ICS
345 COURTLAND STREET, NE
ATLANTA, GEORGIA 30365

RE: RECORD OF DECISION
SODYECO EPA SITE
CHARLOTTE, NORTH CAROLINA

DEAR MS. BENNETT:

PER YOUR REQUEST OF SEPTEMBER 8, 1987, WE HAVE REVIEWED THE RECORD OF DECISION FOR THE SODYECO
NPL SITE IN CHARLOTTE, NORTH CAROLINA.

THIS OFFICE CONCURS WITH THE CHOSEN REMEDY FOR THE SODYECO SITE.

SINCERELY,

JERRY RHODES
ASSISTANT BRANCH HEAD
SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH
ENVIRONMENTAL HEALTH SECTION

CC: JUNE SWALLOW
LEE CROSBY

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

SEPTEMBER 16, 1987

MS. GIEZELLE S. BENNETT
U.S. ENVIRONMENTAL PROTECTION AGENCY
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

DEAR MS. BENNETT:

THE U.S. FISH AND WILDLIFE SERVICE HAS REVIEWED THE DRAFT RECORD OF DECISION FOR THE SODYECO
SITE IN CHARLOTTE, NORTH CAROLINA, DATED SEPTEMBER 4, 1987. THE SERVICE CONCURS WITH THE
RECOMMENDED REMEDY, ALTERNATIVE 9, FOR REMEDIATION OF GROUNDWATER AND SOIL CONTAMINATION.

SINCERELY YOURS,

DAVID H. RACKLEY
ACTING FIELD SUPERVISOR.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

DATE: SEP 15 1987

SUBJECT: RECORD OF DECISION (ROD) FOR THE SODYECO SITE,
CHARLOTTE, NORTH CAROLINA

FROM: JAMES S. KUTZMAN, CHIEF
GROUND-WATER PROTECTION BRANCH

TO: JACK STONEBRAKER, CHIEF
SUPERFUND BRANCH

WE CONCUR WITH THE RECOMMENDED ALTERNATIVES FOR REMEDIATION OF GROUND-WATER AND SOIL
CONTAMINATION AT THE SODYECO SITE PRESENTED IN THIS ROD.

TABLE 1

GROUNDWATER CLEANUP GOALS

COMPOUND	CLEANUP GOAL UG/L
TRICHLOROETHYLENE	2.7 (2)
TETRACHLOROETHYLENE	0.8 (2)
CHLOROBENZENE	60 (1)
ETHYLBENZENE	680 (1)
1,2-DICHLOROBENZENE	400 (5)(3)
TOLUENE	2,000 (1)
XYLENE	440 (1)
ANTHRACENE	2.8 NG/L (4)
FLUORENE	2.8 NG/L (4)
PHENANTHRENE	2.8 NG/L (4)

(1) PROPOSED MAXIMUM CONTAMINANT LEVEL GOALS, 50 FEDERAL REGISTER
46936 (NOVEMBER 13, 1985)

(2) THE CONCENTRATION VALUE GIVEN FOR POTENTIAL CARCINOGENS CORRESPONDS
TO A CANCER RISK LEVEL OF 10^{-6}

(3) INCLUDES ALL ISOMERS

(4) AS TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS, NO CRITERIA SET FOR
THESE COMPOUNDS ALONE

(5) USEPA, "SUPERFUND PUBLIC HEALTH EVALUATION MANUAL," OFFICE OF
EMERGENCY AND REMEDIAL RESPONSE, WASHINGTON, D.C., 1986. USEPA
AMBIENT WATER QUALITY CRITERIA FOR AQUATIC ORGANISMS AND DRINKING WATER.

TABLE 5

SUMMARY OF SCREENING CRITERIA FOR COMPARING ALTERNATIVES

	TECHNICAL FEASIBILITY, RELIABILITY	REDUCES M/T/V	COST
ALTERNATIVE 1			
NO ACTION	MONITORING IF ROUTINE	MINOR REDUCTIONS IN	\$ 170,000
NATURAL SOIL		CONTAMINANT VOLUME	
FLUSHING		WILL REQUIRE AN	
LONG-TERM GW		EXTENDED TIME PERIOD	
MONITORING			
AREAS A-E			
ALTERNATIVE 2			
NATURAL SOIL	NO ENGINEERED SOIL	MINOR REDUCTIONS IN	\$1,016,000
FLUSHING	TECHNOLOGY EMPLOYED;	VOLUME THROUGH	
AREAS B,C,D	GW PUMP & TREAT IS A	FLUSHING;	
GW RECOVERY &	DEMONSTRATED	SIGNIFICANT	
TREATMENT	TECHNOLOGY	REDUCTION IN	
AREAS A-E		MOBILITY AND	
		TOXICITY THROUGH GW	
		PUMP AND TREAT	
ALTERNATIVE 6			
CAP B	ALL TECHNOLOGIES ARE	PROVIDES PERMANENT	\$6,765,000
EXCAVATE	DEMONSTRATED	& SIGNIFICANT	
AREAS C & D		REDUCTIONS IN M/T/V	
INCINERATE			
EXCAVATED			
MATERIALS			
ONSITE			
GW RECOVERY &			
TREATMENT			
AREAS A-E			
ALTERNATIVE 8			
CAP B	INCLUDES AN	PROVIDES PERMANENT	\$3,776,000
EXCAVATE	INNOVATIVE/	& SIGNIFICANT	
AREAS C & D	DEVELOPMENTAL	REDUCTIONS IN M/T/V	
ONSITE	TREATMENT TECHNOLOGY;		
THERMAL	RELIABILITY NOT		
PROCESSING	PROVEN		
OF EXCAVATED			
MATERIALS			
GW RECOVERY &			
TREATMENT			
AREAS A-E			

ALTERNATIVE 9

CAP B	INCLUDES AN	PROVIDES	9A:	\$3,792,000
TREATMENT OF	INNOVATIVE/	PERMANENT AND	9B:	\$3,776,000
AREA C	DEVELOPMENTAL	SIGNIFICANT	9C:	\$2,089,000
SOILS	TREATMENT TECHNOLOGY;	REDUCTIONS IN	9D:	\$3,865,000
9A:	IN-SITU RELIABILITY NOT PROVEN	M/T/V		
	STEAM			
	STRIPPING			
9B:	ONSITE			
	THERMAL			
	PROCESSING			
	(C&D)			
9C:	IN-SITU			
	FLUSHING			
9D:	SOIL			
	WASHING			
EXCAVATE D AND				
	INCINERATE			
	OFFSITE			
GW RECOVERY &				
	TREATMENT			
	AREAS A-E			

ALTERNATIVE 10

CAP B	ALL TECHNOLOGIES ARE	PROVIDES PERMANENT	\$1,568,000
NATURAL SOIL	DEMONSTRATED	& SIGNIFICANT	
FLUSHING		REDUCTIONS IN	
AREA C		M/T/V; MORE	
EXCAVATE AREA		EXTENDED PERIOD TO	
D AND		PUMP AND TREAT GW	
INCINERATE		IN AREA C	
OFFSITE			
GW RECOVERY			
AND			
TREATMENT			
AREAS A-E.			